MM5 &JTWC

Capt Don Schiber, USAF,
Technique Development Officer
NPMOC/JTWC

Requirements

Expand the 36 km window to cover our Genesis Area

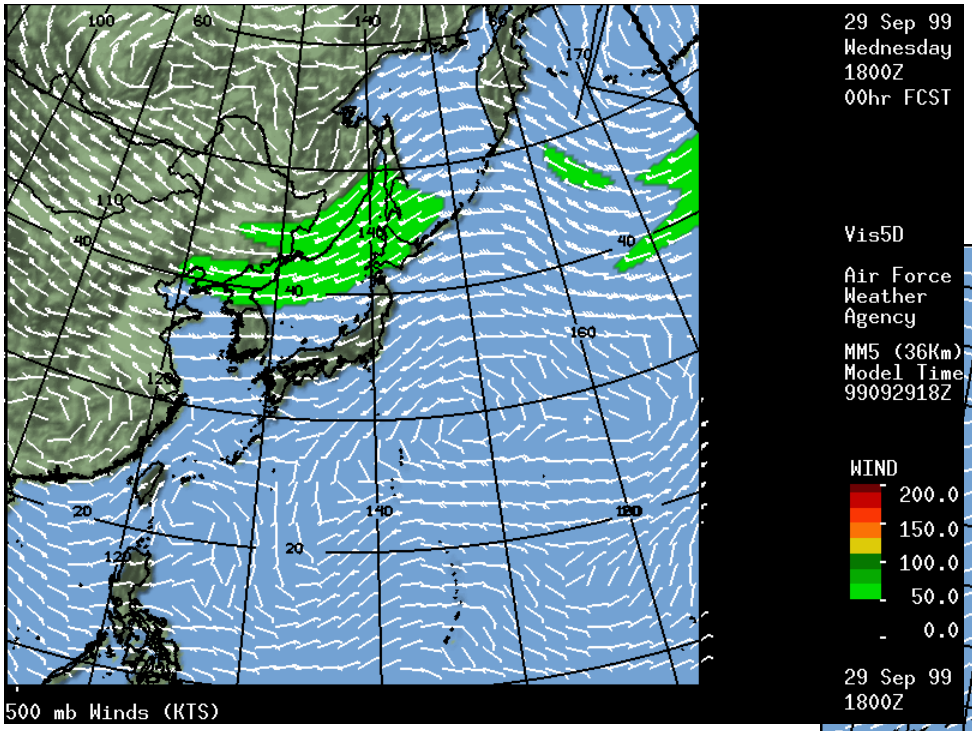
Create a Tropical Cyclone Tracker

- Tracker automatically initiated by Bogus/Warning
- Tracker ingested directly into ATCF via FNMOC
- Tracker should be able to handle multiple storms

Make MM5 fields readily available to watch floor

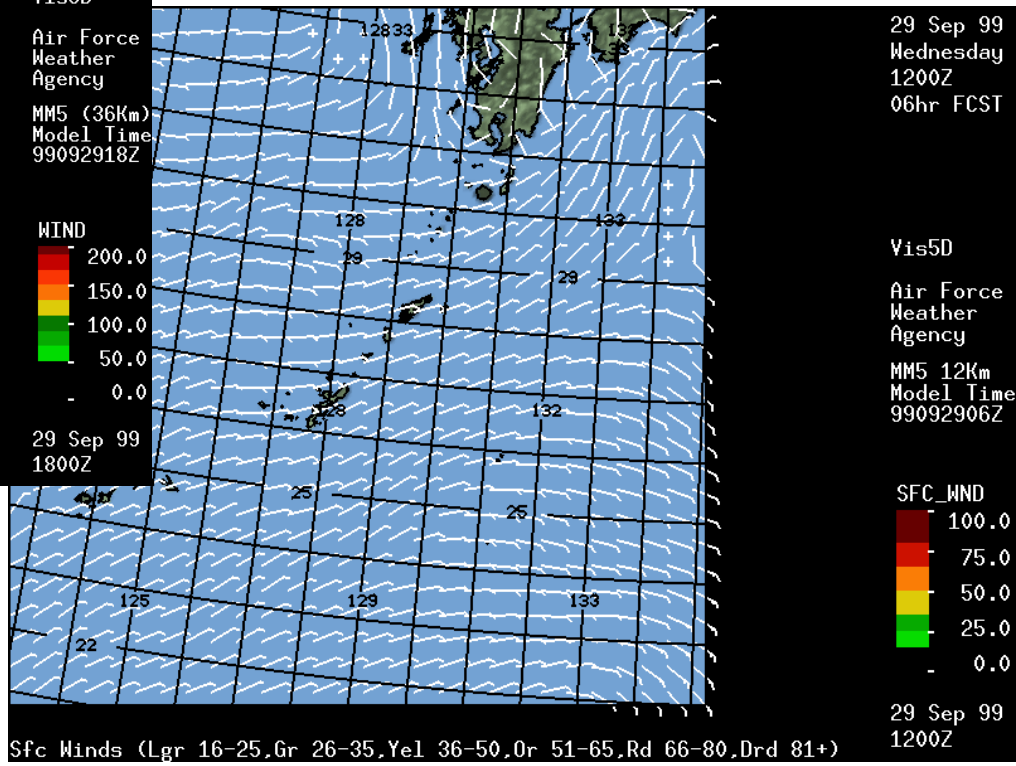
- Integrate MM5 fields into ATCF/SAFA

MM5 Windows

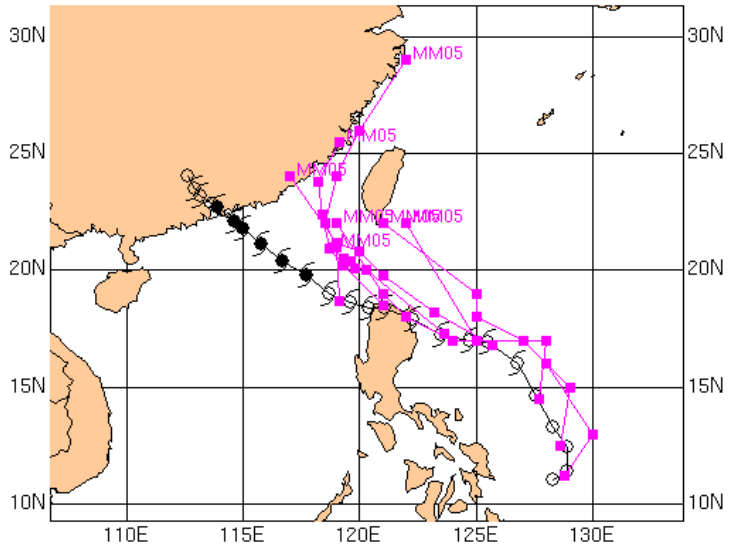


36 km Window

12 km Window

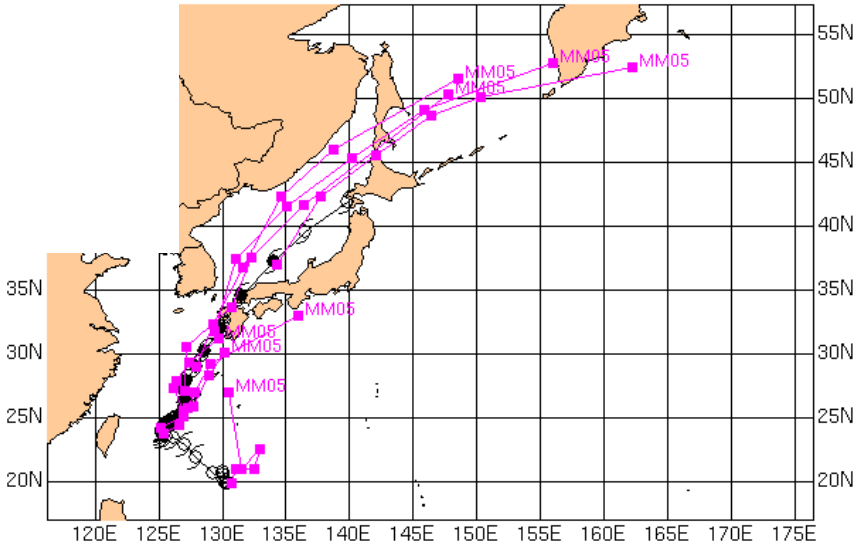


MM5 TC Tracker

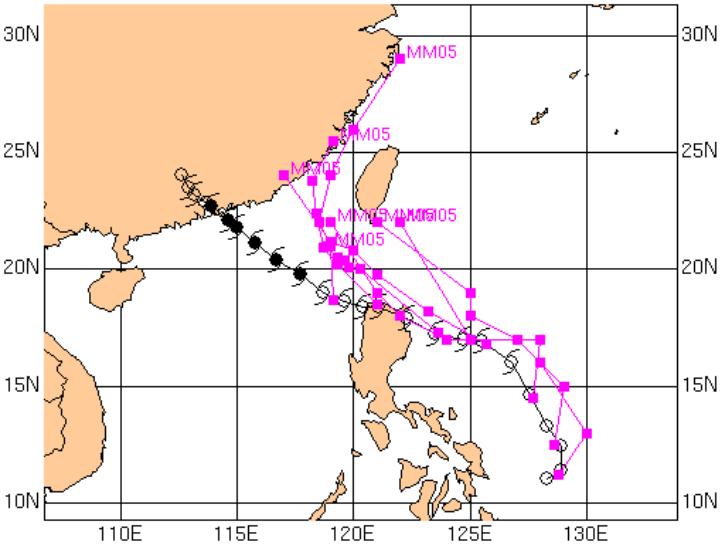


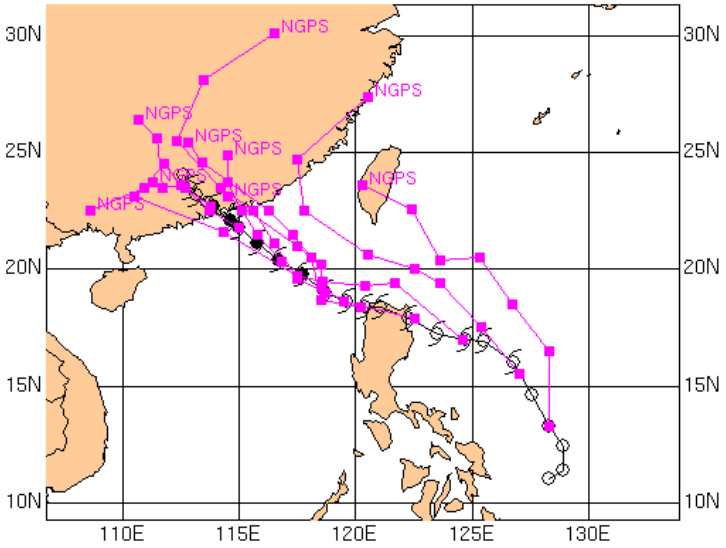
Typhoon Sam
“eyeball tracker”

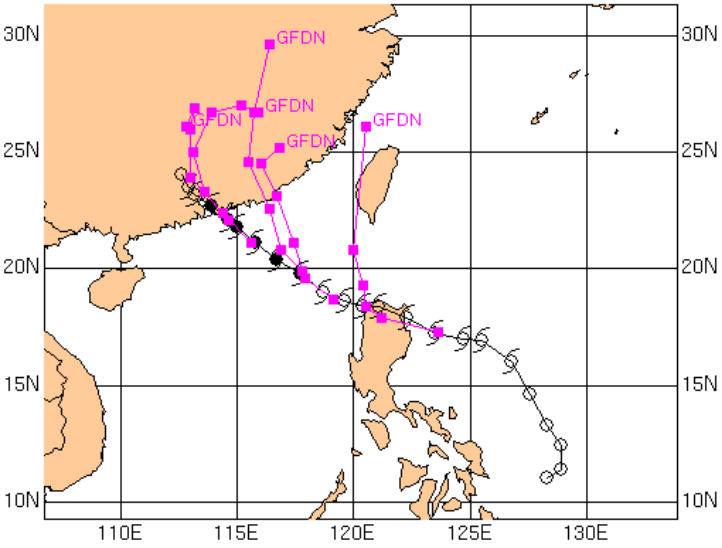
Typhoon Bart- Tracker



WP1699 - Sam

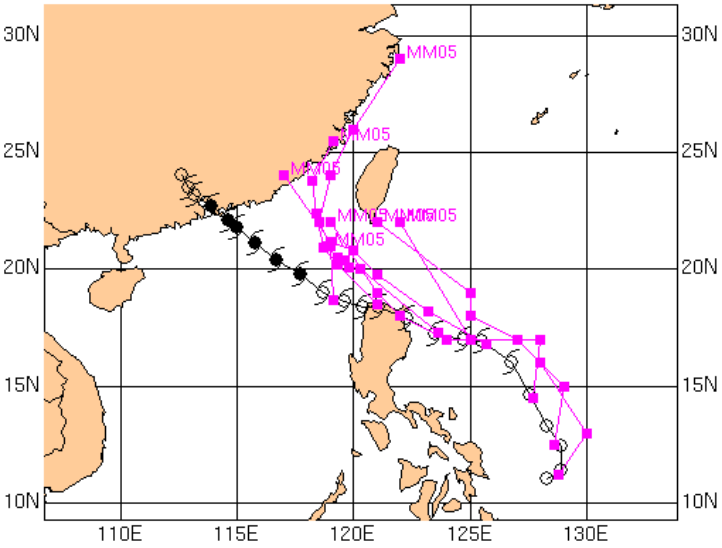


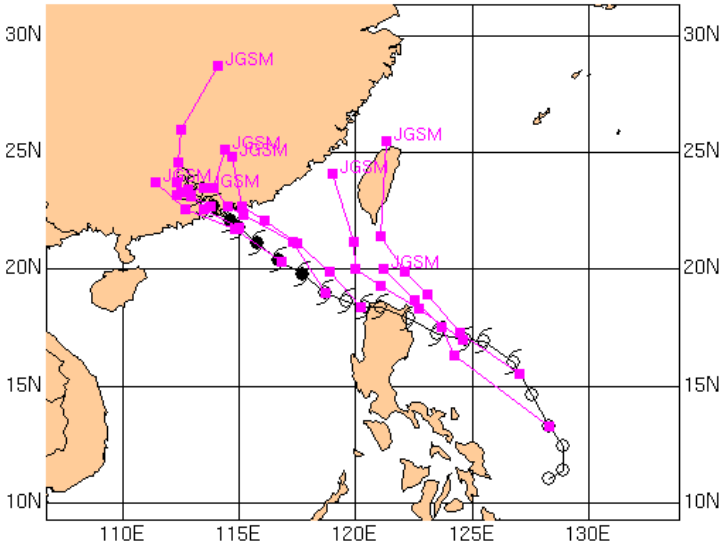


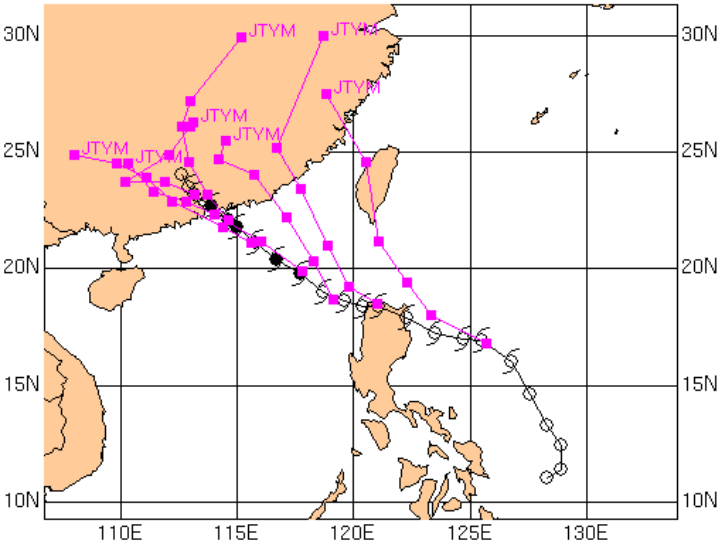


For the first cyclone MM5 was available, WP1699(Sam), the model performed well for the f forecasts and then showed a northeast bias for th of the forecast. Although the NOGAPS model (NG well as the Geophysical Fluid Dynamics Navy (GF model also had a northeastward bias, it wasn't as However, it's important to note that a true tracke available until Typhoon Bart (WP2499). Hence, th coordinates and most of what follows are derived "eyeballing" either the sea level pressure or the w on the 36km window.

WP1699 - Sam

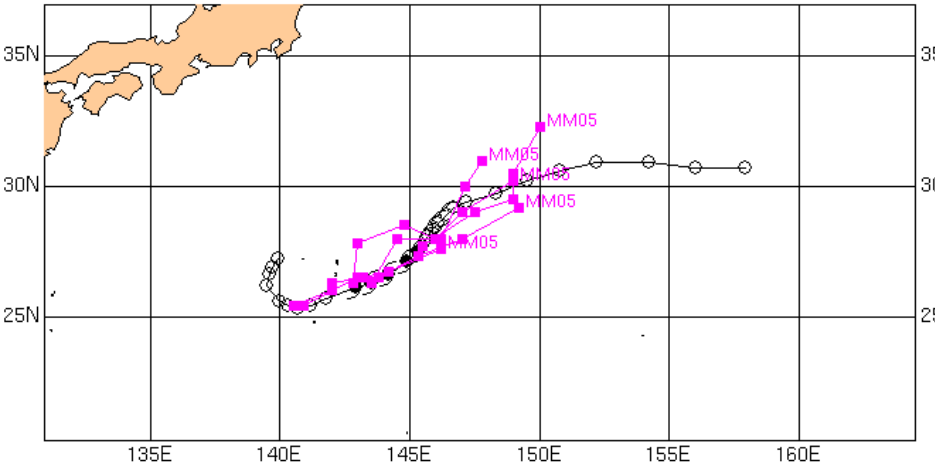


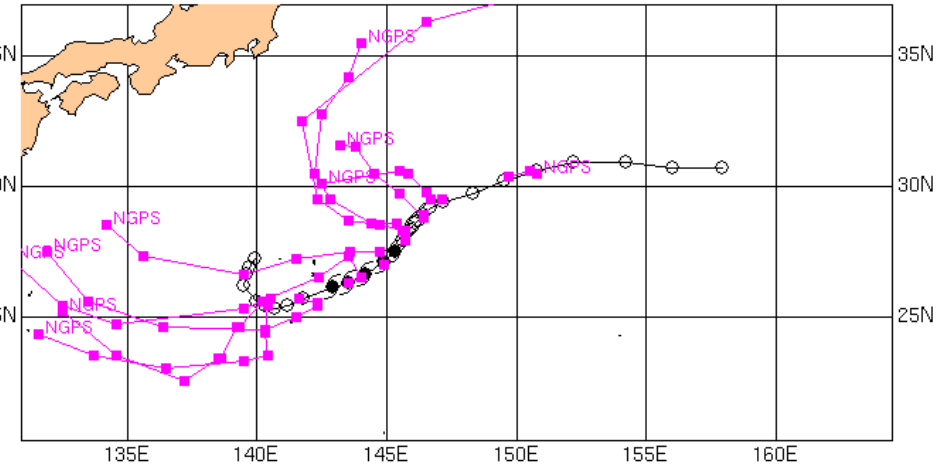


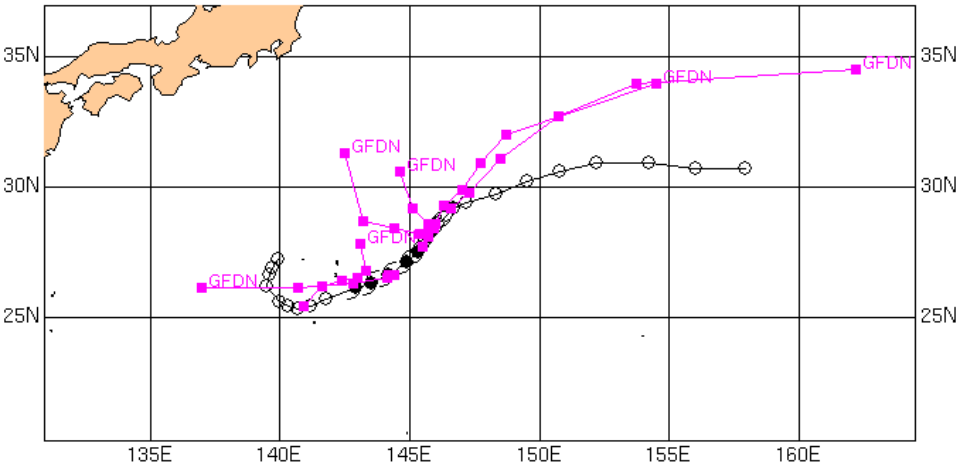


The MM5 model also compared unfavorably again
Japanese Meteorological Agency (JMA) Global mo
(JGSM) and their Typhoon model (JTYM). Howeve
it's important to note the other models had a bett
handle on the system after it was west of Luzon, s
we were just starting the process during Sam, so
the data was not archived and the later model ru
have improved the overall performance.

WP1999 - Virgil

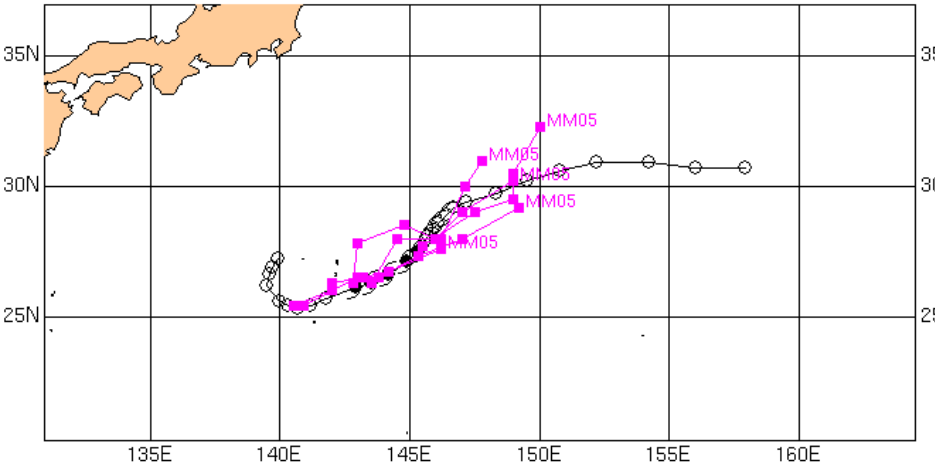


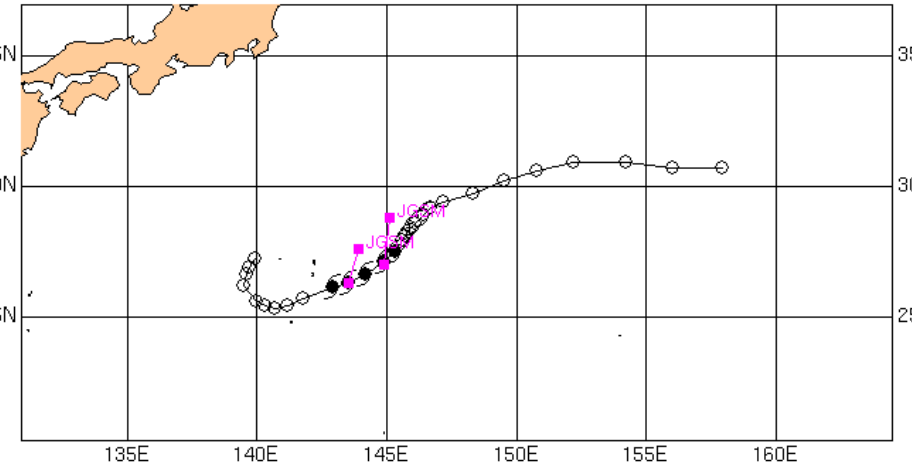


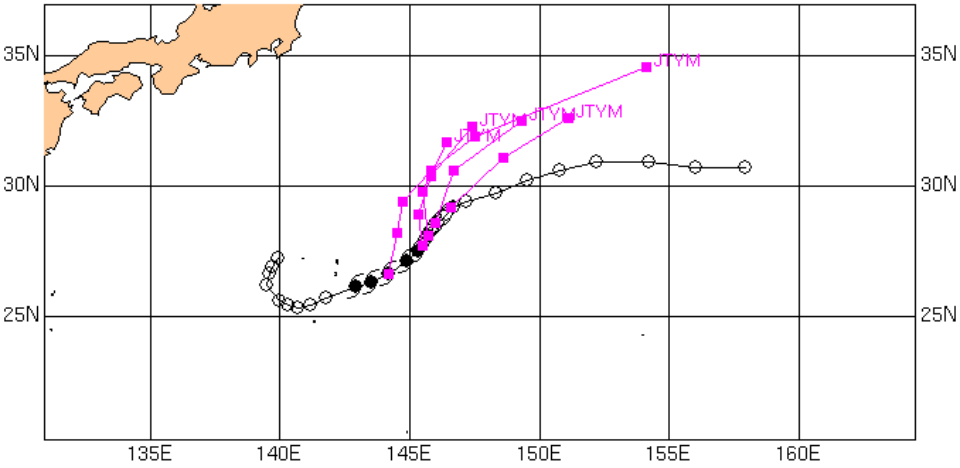


The MM5 model actually handled Typhoon Virgil
than any other model over all. As you can see, bot
NOGAPS and GFDN took the cyclone westward d
the early part of the storm and later took it to the
northeast. The MM5 model kept the system movi
the right direction throughout the forecast. This i
interesting since Virgil was a midget which forme
very high latitude, which makes it rather unique.
Unfortunately, with just one system its impossible
make the statement that MM5 always handles the
systems well.

WP1999 - Virgil

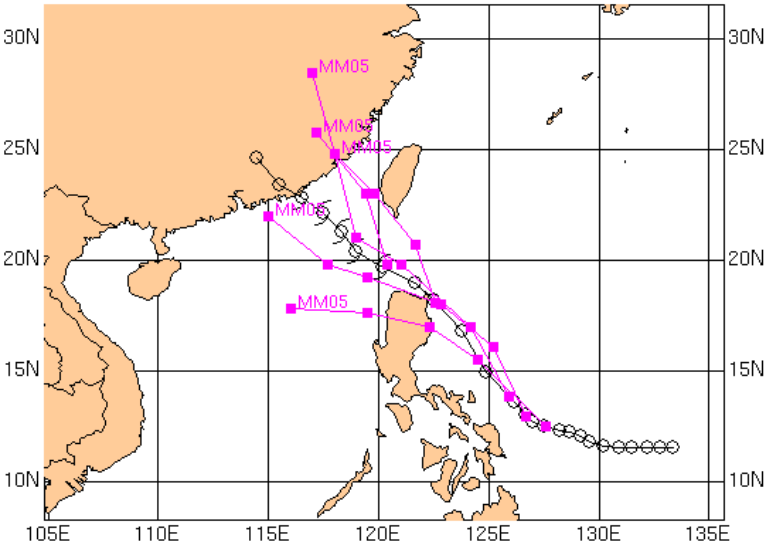


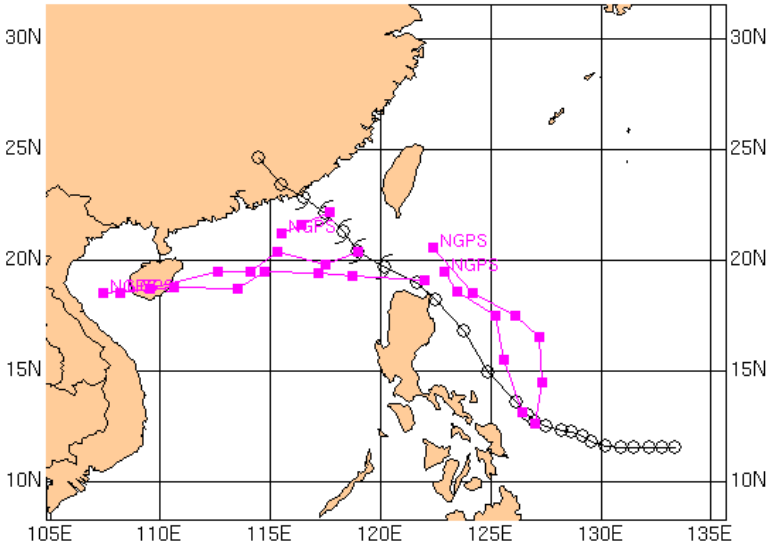




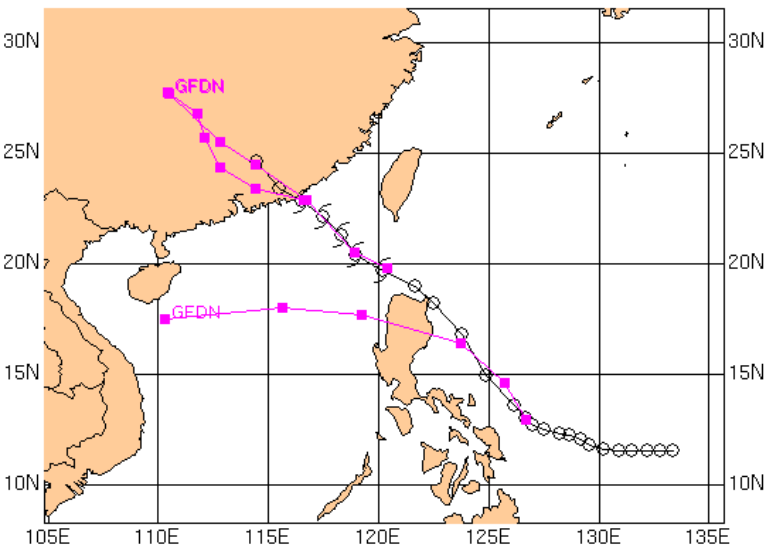
In comparison with the JMA models, MM5 beat th
typhoon model (JTYM) at the 24 and 72 hour posit
but was edged out at the 48 hour. However, since
had 7 forecasts and JTYM only had 1 which went
to the 48 hour mark it is not a fair comparison. JT
did have a poleward bias throughout the forecast.
that JGSM appeared to have a pretty good handle
track, but only 12 hour positions were issued. Thi
due to the fact Virgil was a midget and none of th
models, including MM5, handled its true intensity
Since JGSM had the cyclone as less than 25 knots
the tracker dropped it.

WP2099 - Wendy

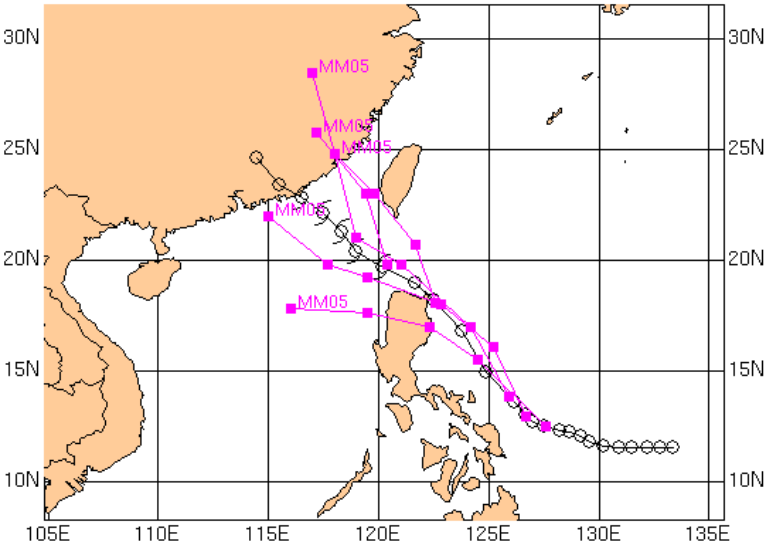


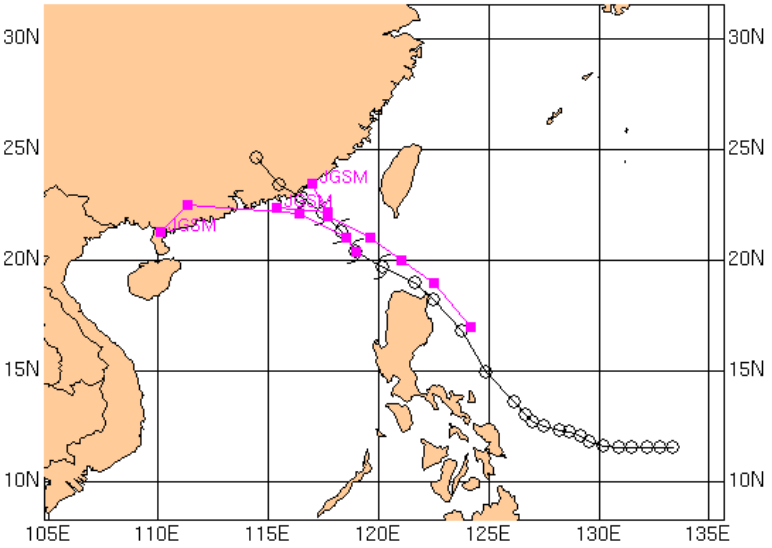


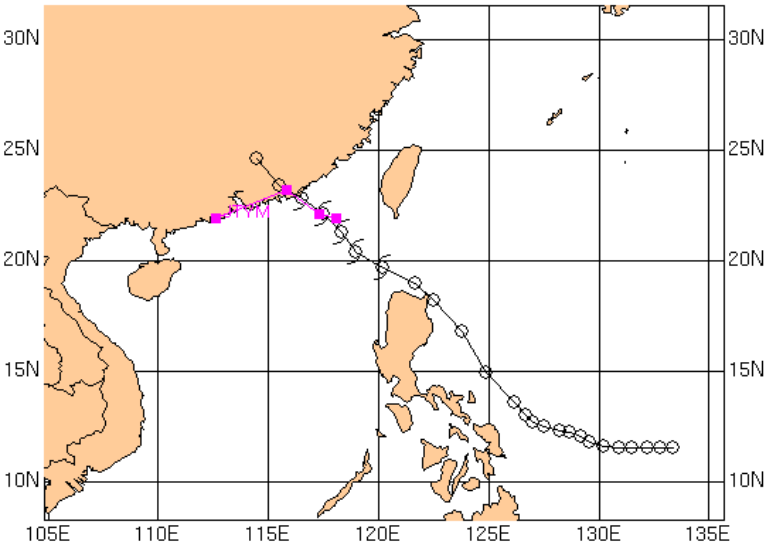
MM5 did a decent job on Wendy, but once again s
a poleward/northeast bias as the system headed n
NOGAPS had a westward bias after the system we
of Luzon and GFDN's forecasts were sporadic. Du
this storm, MM5 beat both models at the 48 and 7
mark.



WP2099 - Wendy

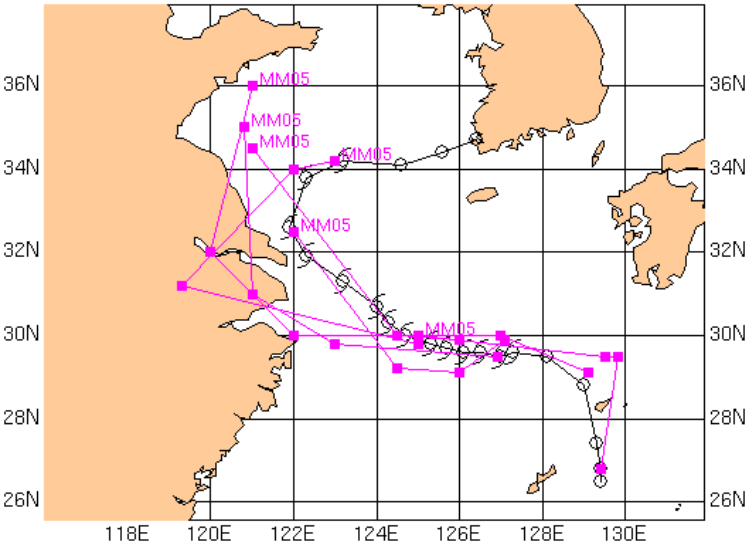


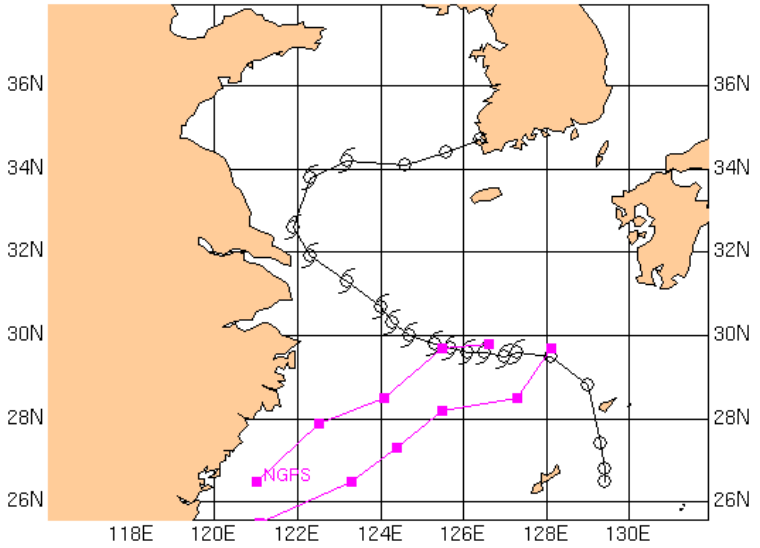




For WP2099 (Wendy), MM5 faired well compared
the JMA models at the 24 hour position, but was e
out by the Global model at the 48 hour mark. Not
JGSM model only had one 48 hour forecast and th
true comparison is not possible. The typhoon mod
had one 24 hour forecast and is not comparable.

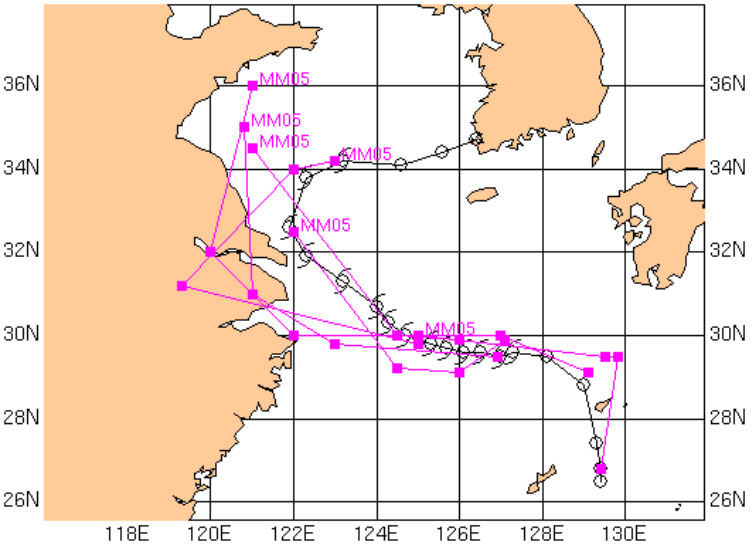
WP2399 - Ann

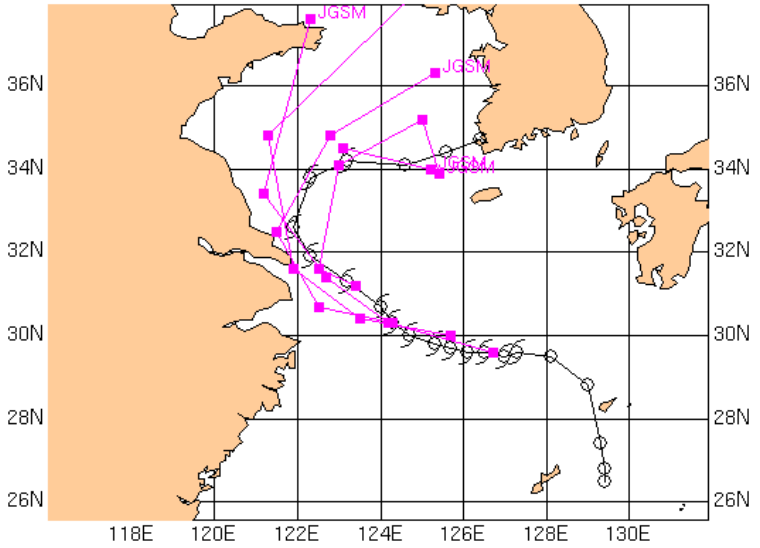


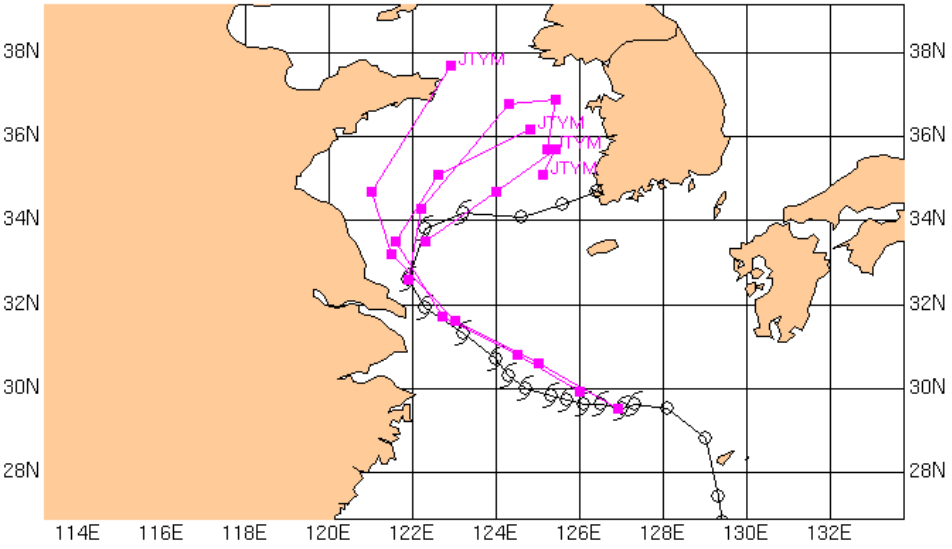


The MM5 model actually outperformed the NGPS model on WP2399(Ann). Once again this was a relatively high latitude system. Also, unlike the majority of the AOR, this area has a lot of synopti data, which may have played a part in MM5's performance.

WP2399 - Ann

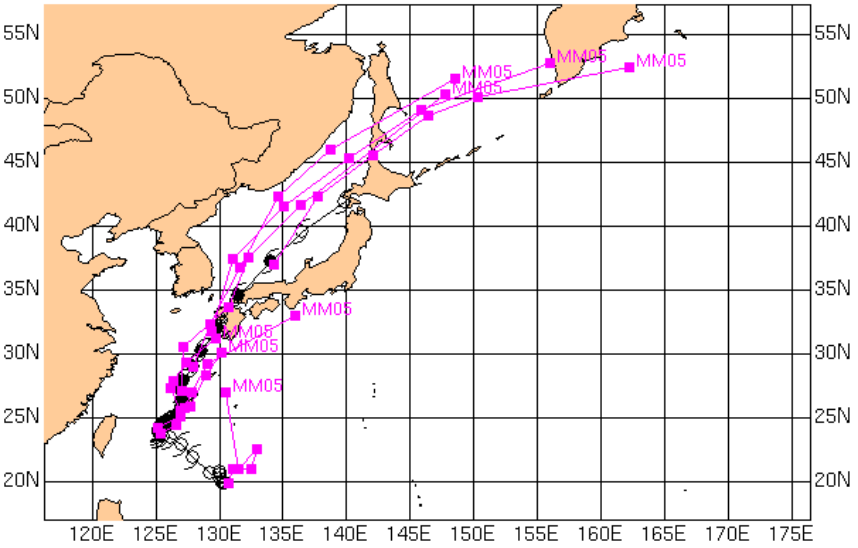


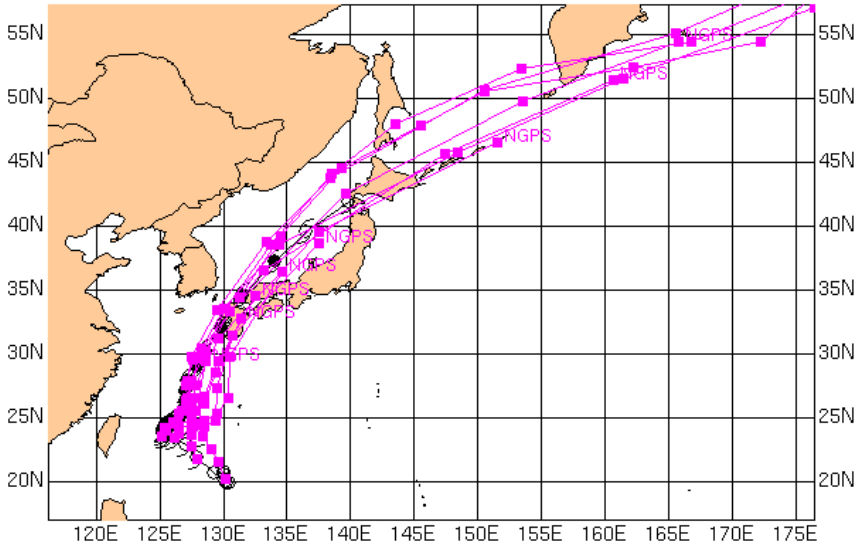


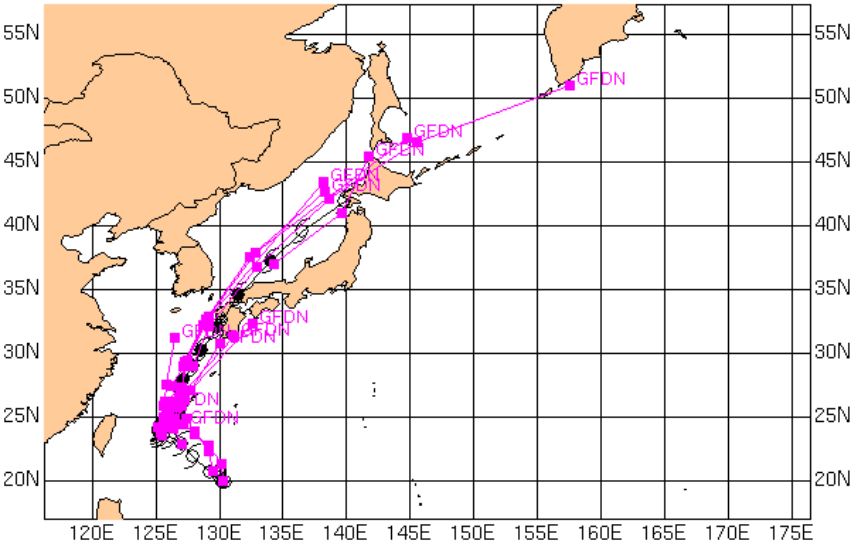


The MM5 model beat out the JMA global model as
as the typhoon model at 48 hours and 72 hours. I
the JTYM model appeared to have the better han
the system as it showed a much smoother recurva
However, the fact that the MM5 model fared so w
an area where the JMA models are the strongest
pretty impressive.

WP2499 - Bart

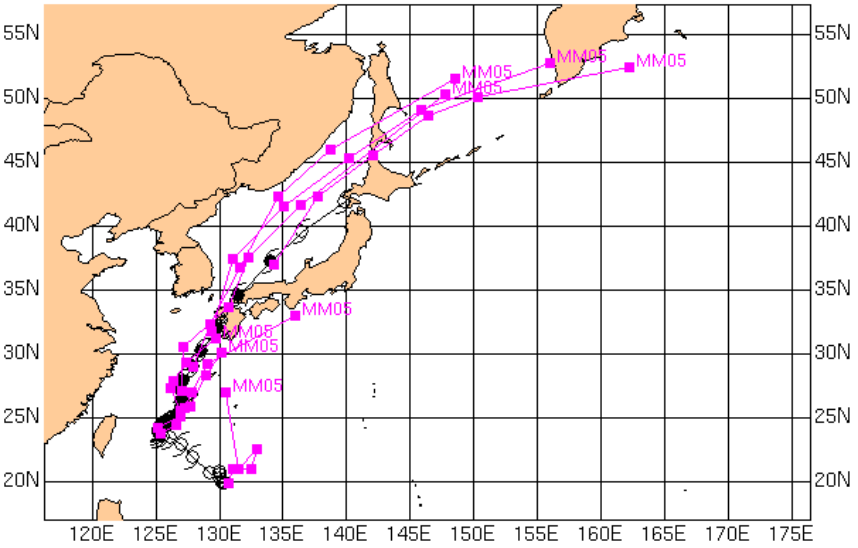


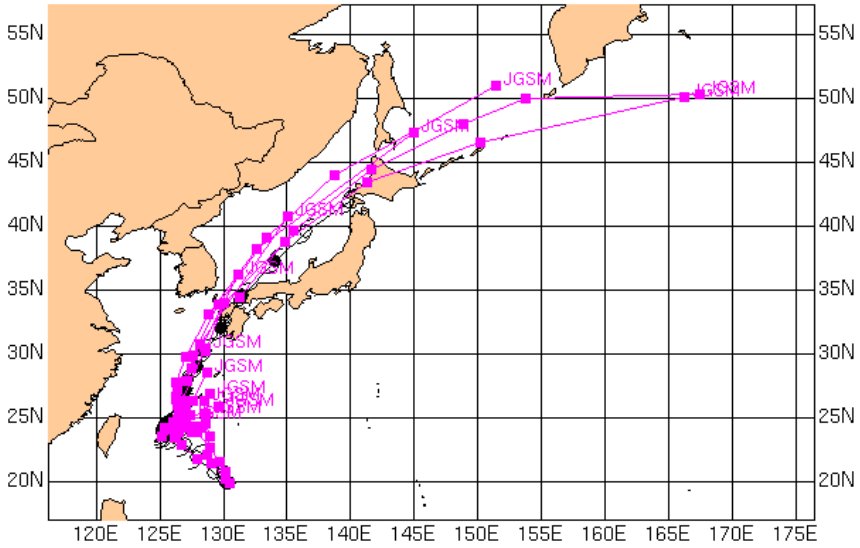




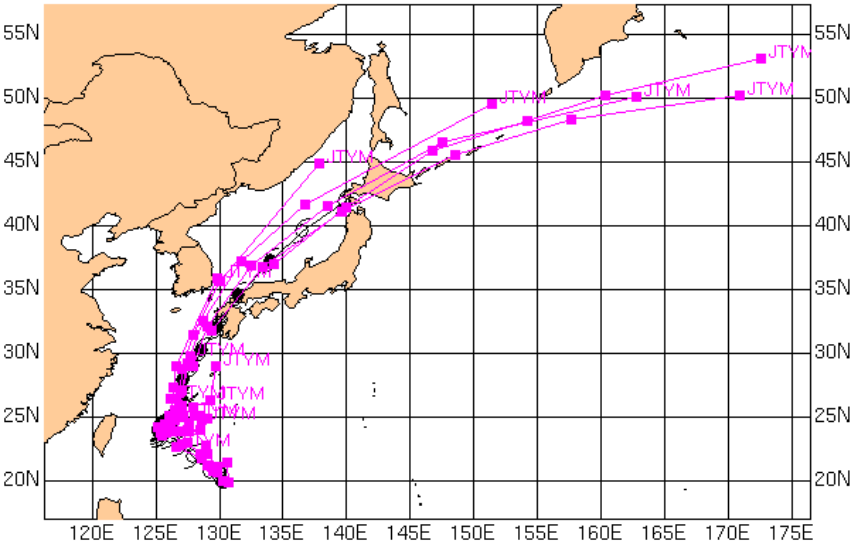
For WP2499(Bart), the MM5 model faired poorly
relation to the NOGAPS model as well as the GFD
Bart was a classic recurvature and acceleration p
Although MM5 appears to have a handle on the cy
track, it was probably the speed and the slight po
bias that reduced its performance.
Important Note: Bart was the first storm that the
rudimentary MM5 tracker was available.

WP2499 - Bart





Once again, the MM5 model didn't compete well
the JMA models under this synoptic situation.



Observations

- The MM5 Model appears to have a Northeastward/Poleward bias
- The MM5 Model has handled several systems well at high latitudes
- There were not enough high latitude storms to claim MM5 always handles them well.
- The MM5 model does show some skill in comparison to the other dynamic models but there are not enough case studies to draw solid conclusions at this time
- The model handles the systems fairly well considering the tropical cyclone initial positions are not bogus'd into the model. By adding a "Bogus" position, the model may fare even better.
- The tracker appears slightly erratic